

REMARKS

Claims 60 and 61 are canceled. Claims 1-59 are pending, of which Claims 1, 13, 24, 34, 35, 43, 51, and 59 are independent. Claims 1, 3-5, 7-13, 15-17, 19-24, 26, 27, 29-40, 42-48, 50-56 and 59-61 were rejected. The Applicants note, with appreciation, that Claims 2, 6, 14, 18, 25, 28, 41, 49, 57 and 58 were objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form. For the reasons discussed below, all claims are now in condition for allowance. Reconsideration is respectfully requested.

Claim Objections

Claims 10 and 42 were objected to based on informalities. The Examiner noted that Claim 10 recited the term “either” where only one option was provided, and that Claim 42 depended from Claim 40, even though it references limitations that were recited in Claim 41. The Applicants appreciate the Examiner’s attentiveness to the accuracy of the claims. In response to the Examiner’s objections, Claim 10 is amended to remove the term “either”, and Claim 42 is amended to properly depend from Claim 41. Acceptance and reconsideration are respectfully requested.

35 U.S.C. § 112 Rejection

Claim 50 was rejected under 35 U.S.C. § 112, second paragraph, for indefiniteness. In particular, the Examiner noted it was self-dependent. In response to the Examiner’s rejection, Claim 50 is amended by the present amendment to properly depend from Claim 49. Acceptance and reconsideration are respectfully requested.

35 U.S.C. §§ 102(b) and 103(a) Rejections

Claims 1, 3-5, 7, 8, 10-13, 15-17, 19, 20, 22-24, 26, 27, 29, 30 and 32-34, of which Claims 1, 13, 24 and 24 are independent, were rejected under 35 U.S.C. § 102(b) based on U.S. Patent No. 6,327,863 to Yamartino et al. Claims 9, 21 and 31 were rejected under 35 U.S.C. 103(a) based on Yamartino in view of U.S. Patent No. 5,450,316 to Gaudet et al. Claims 35-40, 42-48, 51-56, 59, 60 and 61, of which Claims 43, 51, 59 and 60 are independent, were rejected

under 35 U.S.C. § 103(a) based on Yamartino et al in view of U.S. Patent No. 3,254,871 to Limon. These rejections are traversed. Reconsideration is respectfully requested.

Preferred embodiments of the invention relate to techniques for the prevention of safety hazards arising from an unsafe condition in a cryopump. An unsafe condition can, for example, be a power failure, faulty temperature sensing diode in the cryopump, or temperature of the cryopump exceeding a threshold temperature level. Preferably, one or more purge values are controlled using local electronics during unsafe conditions.

A. Retaining a Normally Open Purge Valve Closed, Independent Claims 1, 13, 24 and 34

Independent Claims 1, 13, and 24 are directed to an embodiment of the invention that relates to retaining a normally open purge valve closed during unsafe conditions. Local electronics that are coupled to a cryopump are used to retain a normally open purge valve closed in response to an unsafe condition. The normally open purge valve is retained closed for a period of time, such as two minutes.

One example of a normally open purge valve is a solenoid valve. A normally open solenoid valve is electrically operated and has two states, fully open and fully closed. When the normally open solenoid valve is energized, it is held closed, and when power is lost, it opens. With the technique set forth in Claims 1, 13, and 24, however, a normally open purge valve is retained closed during unsafe conditions for a period of time.

Using a normally open purge valve assures that in the event of loss of power to the valve, the purge valve opens to a safe condition in which otherwise volatile gases are diluted and purged by the purge gas. By retaining a normally open purge valve closed for a period of time during, for example, a power failure, a situation can be avoided where power loss causes purge gas to be emitted into the pump. Unnecessary purging of the pump can lead to a waste of valuable time and resources. Purging the pump, for example, destroys the vacuum in the cryopump and causes a release of gases that may then require regeneration. Delaying the purge,

however, by retaining a normally open purge valve closed, allows for possible retention of power and possible recovery, without interrupting operation of the cryopump with a purge.

By way of contrast, Yamartino discusses a normally closed purge valve. Yamaratino, col. 5, ll. 27-27. During unsafe conditions, a normally closed purge valve, such as the Yamartino purge valve, would likely not open during a power failure because it is a normally closed valve. Consequently, Yamartino neither discusses the requirements of the invention, nor addresses the problems associated with normally open purge valves.

Thus, the Examiner has not made a *prima facie* case for anticipation under § 102 (b). Reconsideration of the rejection of independent Claims 1, 13, 24 and 34, and their respective dependents, Claims 3-5, 7, 8, 10-12, 15-17, 19, 20, 22-23, 26, 27, 29, 30 and 32-33, under § 102 (b) is respectfully requested.

B. Holding a Purge Valve Closed for a Safe Period of Time Using a Capacitor, Independent Claims 43, 51 and 59

Independent Claims 43, 51 and 59 are directed to an embodiment of the invention that relates to holding a purge valve closed during unsafe conditions using a capacitor. The capacitor, such as an electrochemical capacitor, stores an amount of energy that is discharged within a discharge time. The discharge time is a safe period of time by which the purge valve must open. The safe period of time can be, for example, two minutes.

Limon's industrial furnace time delay system, which uses a capacitor to prevent a normally closed gas supply valve from closing, does not relate to the claimed capacitor for a cryopump that enables a purge valve to stay closed during unsafe conditions.

In addition, Limon's industrial furnace time delay system is nonanalogous art to the claimed invention. The invention relates to cryopumps; whereas Limon relates to furnaces. Limon's system valves a combustible gas; whereas the invention valves a purge gas that avoids

combustion. It is respectfully submitted that one of ordinary skill in the cryopump art would not look to Limon's industrial furnace time delay system.

Even if a designer in the field of cryopumps were to look to furnaces art for a solution, it would only be after seeing a need in the cryopump art. There is no suggestion in Yamartino of causing a purge valve to remain closed for a delay after a power failure. (Column 9, lines 29-47 of Yamartino, cited by the Examiner, relates to delaying the opening of a gate valve after power has resumed, not delaying the opening of a purge valve during a power failure.) Accordingly, the cryopump designer would have no need to look to Limon for a valve control solution.

Even combined, the references do not teach the invention. Limon relates to a time delay system that maintains open a normally closed gas supply valve to an industrial furnace during a power failure. Limon's time delay system enables the industrial furnace to continue to have a gas supply during power interruptions by preventing the normally closed gas valve from closing; whereas the invention delays purge gas from being emitted into the pump.

Thus, it is respectfully requested that the rejection of Independent Claims 43, 51 and 59, and their respective dependents, be withdrawn. Reconsideration is respectfully requested.

Claim Amendments

Claims 36 and 44 are amended to properly reference the "purge valve" limitation set forth in their respective independent claims. Claims 60 and 61 are canceled. Acceptance is respectfully requested.

Information Disclosure Statement

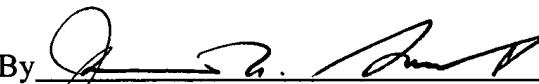
An Information Disclosure Statement (IDS) was filed on November 9, 2004. Entry of the IDS is respectfully requested.

CONCLUSION

In view of the above amendments and remarks, it is believed that all claims are in condition for allowance, and it is respectfully requested that the application be passed to issue. If the Examiner feels that a telephone conference would expedite prosecution of this case, the Examiner is invited to call the undersigned attorney.

Respectfully submitted,

HAMILTON, BROOK, SMITH & REYNOLDS, P.C.

By 

James M. Smith

Registration No. 28,043

Telephone: (978) 341-0036

Facsimile: (978) 341-0136

Concord, MA 01742-9133

Dated: 